

PRE-COLLEGE STUDENTS CONTRIBUTE TO THE CASSINI-JUPITER MILLENNIUM FLYBY

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ABSTRACT

When the Cassini spacecraft flew past Jupiter a few months ago, not only were scientists able to collect high-resolution data on Jupiter's radiation belts, but students and their teachers across the U.S. had an opportunity to carry out real science observations. Teachers and students participating in the Goldstone-Apple Valley Radio Telescope (GAVRT) science education partnership were invited to collaborate with a science research team to perform a series of ground-based observations of Jupiter coordinated with spacecraft observations during the Cassini encounter from November 2000 through March 2001.

The GAVRT antenna, formerly known as DSS-12, was decommissioned from NASA's Deep Space Network (DSN) in 1996. With the effort of a team of visionary scientists, educators, engineers, and community volunteers, the antenna found new life as an educational tool that offers teachers and students across the country a unique opportunity to experience the scientific process as well as contribute directly to important, current research. The GAVRT project is jointly managed by the Lewis Center for Educational Research in Apple Valley, CA and the DSN Science Office at the Jet Propulsion Laboratory in Pasadena.

An ongoing curriculum of the GAVRT partnership is called Jupiter Quest, a hypothetical mission to Jupiter or one of its moons. Students measure the radio emission from Jupiter's atmosphere and its radiation belts using the radio telescope (controlled via the Internet and GAVRT Mission Control in Apple Valley). They use the information in their mission plan and NASA scientists use the data in their studies of the Jovian radiation belts.

The Cassini-Jupiter Microwave Observing Campaign (JMOC) involved ground-based measurements of Jupiter's microwave emissions to calibrate and support the interpretation of simultaneous measurements taken by a microwave receiver on the Cassini spacecraft. GAVRT students and teachers delivered to the Cassini program a prescribed set of radio astronomy measurements. The GAVRT data are being used to enhance the science return at Jupiter and to provide in-flight calibration data that will enable Cassini to perform previously unplanned microwave observations when the spacecraft reaches the Saturn system in 2004. Forty-one Jupiter Quest teachers at 26 schools in 13 states gave their students a chance to become part of an interdependent science team.

The GAVRT program allows students and teachers to reach beyond science education as the mere learning of facts and concepts. It gives them a real and exciting experience of solving unexpected problems, of collecting data on heretofore unknown or poorly understood phenomena, and of interpreting the results. Many teachers

participating in Cassini-JMOC report that their students were greatly excited by the project, gaining confidence in themselves and comfort with the scientific process. To participate in the program, qualified teachers receive a week of training at either the Lewis Center or at Auburn University, Auburn, Alabama.

BIOGRAPHY

Michael Klein is a radio astronomer at the Jet Propulsion Laboratory with more than 35 years experience observational research. He currently manages the DSN Science Office and leads JPL's participation in the GAVRT science education partnership. Jim Roller has 30 years experience as a credential teacher and currently the leads the GAVRT program at the Lewis Center for Educational Research, where he is the Senior Vice President of Science and Technology.

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